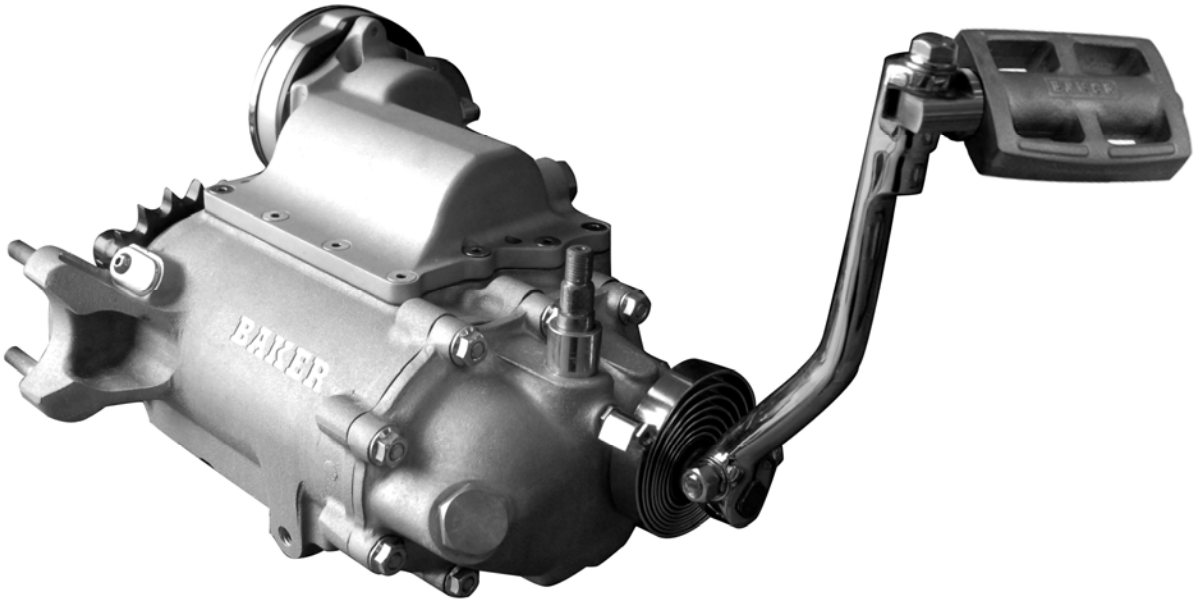
BAKER 4 SPEED TRANSMISSION



P/N:	4-7090	(4 Speed Transmission; 1970-E1984 Splined Mainshaft)
	4-70E84	(4 Speed Transmission; 1970-E1984 Tapered Mainshaft)
	4-6569	(4 Speed Transmission; 1965-1969 Tapered Mainshaft)
	4-3664	(4 Speed Transmission; 1936-1964 Tapered Mainshaft)

BAKER 4 SPEED OVERVIEW

FEATURES

We understand the love affair with your vintage motorcycle, there's nothing like putting authentic, vintage styled components on your nostalgic bike. That's why BAKER has taken the time to reinvent the 4 Speed. A vintage styled BAKER cast aluminum (A356-T6) transmission case, designed for traditional gear drive speedo pick up and a modern late model electronic speedo pick up. Vintage style BAKER billet aluminum (6061-T6) top cover with linear detent system for that smooth reliable shift quality you have come to expect from BAKER. BAKER Klassic Kicker Gears come standard on kicker models; modern BAKER 4 Speed Gearset made out of high grade 8620 gear steel, all gears ride on needle bearings; no more brass bushings here. Direct bolt-in transmission for most applications.

FITMENT

- 1936-E1984 FL®/FX® Shovelhead®, Panhead®, Knucklehead®, Sturgis Shovelhead®
- Custom Applications

TOOLS REQUIRED

- Torque Wrench (reads both in. lbs. and ft. lbs.)
- Common Hand Held Tools (Allen Wrenches, Sockets, Snap Ring Pliers, Etc.)
- Main Drive Gear & Bearing Service Tools
    - BAKER pn Tool A
    - H-D® Equivalent pn 35316A
- Pulley Nut Socket
    - BAKER pn TOOL D
    - H-D® Equivalent pn 94660-37B
- Fork Shifter Gauge
    - H-D® P/N 96384-39
    - JIMS® P/N 16-0641

SPECIFICATIONS

- **TRANSMISSION FLUID CAPACITY:** 22-24 fluid oz. BAKER Recommends: Spectro™ Heavy Duty Platinum 6 Speed Transmission Oil, pn BD-75140
- **COUNTERSHAFT END PLAY:** .007"-.012"
- **2nd GEAR END PLAY:** .003"-.010"
- **3rd GEAR END PLAY:** .003"-.010"
- **1st/2nd AND 3rd/4th SHIFT DOG TOOTH GAP:** .060" per side
- **SHIFT DRUM END PLAY:** .0005"-.0065"
- **RATCHET PAWL ADJUSTMENT:** Per Your Factory Service Manual

GEAR RATIOS

1ST 2.50

2ND 1.70

3RD 1.25

4TH 1.00

BAKER 4 SPEED DRIVE GEAR RATIOS

SPEEDOMETER GEAR DRIVE

BAKER 4 Speed Transmissions all come with a gear drive speedometer ring gear installed on the gearset. Using the list below; pending the year and model of you motorcycle you will have to use the following gear drive unit OEM part number or equivalent for your speedometer to function correctly.

Year	Speedometer Drive Ratio	OEM Drive Unit PN
1936-61	2:1 Ratio, 7 Tooth Drive Ring Gear	67130-36 (11 Tooth Drive Unit)
1962-67	1:1 Ratio, 4 Tooth Drive Ring Gear	67130-61 (13 Tooth Drive Unit)
1968-80	1:1 Ratio, 7 Tooth Drive Ring Gear	67130-69 (23 Tooth Drive Unit)

1947-61 FL Models use a 2:1 Ratio Speedometer
1962-80 FL Models, 1971-72 FX Models and 1980-83 Models use a 1:1 Ratio Speedometer

BAKER 4-Speed part numbers and default speedometer gear drive configurations listed below unless specified by customer that they are using the 1962-67 ratio as specified above.

BAKER Default Speedometer configurations unless specified:

Year	Speedometer Drive Ratio	OEM Drive Unit PN
4-3664	2:1 Ratio, 7 Tooth Drive Ring Gear	67130-36 (11 Tooth Drive Unit)
4-6569	1:1 Ratio, 7 Tooth Drive Ring Gear	67130-36 (11 Tooth Drive Unit)
4-70E84	1:1 Ratio, 7 Tooth Drive Ring Gear	67130-69 (23 Tooth Drive Unit)
4-7090	1:1 Ratio, 7 Tooth Drive Ring Gear	67130-69 (23 Tooth Drive Unit)

ELECTRONIC SPEEDOMETER SENSOR OPTION

On 1965-E84 BAKER 4-Speed Transmission Cases (Ear Version Cases) you have the option to use a modern electronic speed senor. The transmission will house any Big Twin H-D® style speed sensor from 1996-2006. For installation of the electric speed sensor see page 17.

- Speed Sensor, Electronic
  - H-D® pn 74437-96
- Speedometer Recalibration Box
  - BAKER pn 95E-56A

BAKER 4 SPEED TORQUE VALUES

TORQUE VALUES		THREADLOCKER / LUBRICANT
RATCHET COVER		
• 10-24” Bolts:	45-50 in-lbs (3-4 ft-lbs)	Blue Loctite® (242 Removable)
SHIFT LEVER		
• 10-24” Bolts:	40-45 in-lbs (3-4 ft-lbs)	Blue Loctite® (242 Removable)
KICKER COVER		
• 5/16” Nuts:	200-225 in-lbs (16-18 ft-lbs)	Blue Loctite ® (242 Removable)
KICKER CRANK GEAR		
• 30-35 ft-lbs	(40-47 Nm)	Red Loctite ® (271 Permanent)
TOP COVER		
• 1/4” Bolts:	100-120 in-lbs (8-10 ft-lbs)	Blue Loctite ® (242 Removable)
RETAINING PLATE, MAINSHAFT		
• 1/4” Bolts:	100-120 in-lbs (8-10 ft-lbs)	Blue Loctite ® (242 Removable)
MAINSHAFT NUT		
• 45-50 ft-lbs	(61-67 Nm)	Red Loctite® (271 Permanent)
RATCHET GEAR NUT		
• 50-60 ft-lbs	(67-81 Nm)	Red Loctite® (271 Permanent)
COUNTERSHAFT NUT		
• 30-35 ft-lbs	(40-47 Nm)	Red Loctite® (271 Permanent)
FILL PLUG		
• 30-40 in-lbs		Pipe Thread Sealant
DRAIN PLUG		
• 30-40 in-lbs		Anti-Seize
SPROCKET NUT		
• 50 ft-lbs (67.8 Nm) initial torque; then turn another 30-40 degrees; 45 degrees max.		Red Loctite® (271 Permanent)

BAKER 4 SPEED EXPLODED VIEWS

Replica Cast and Chrome styled Kicker Covers

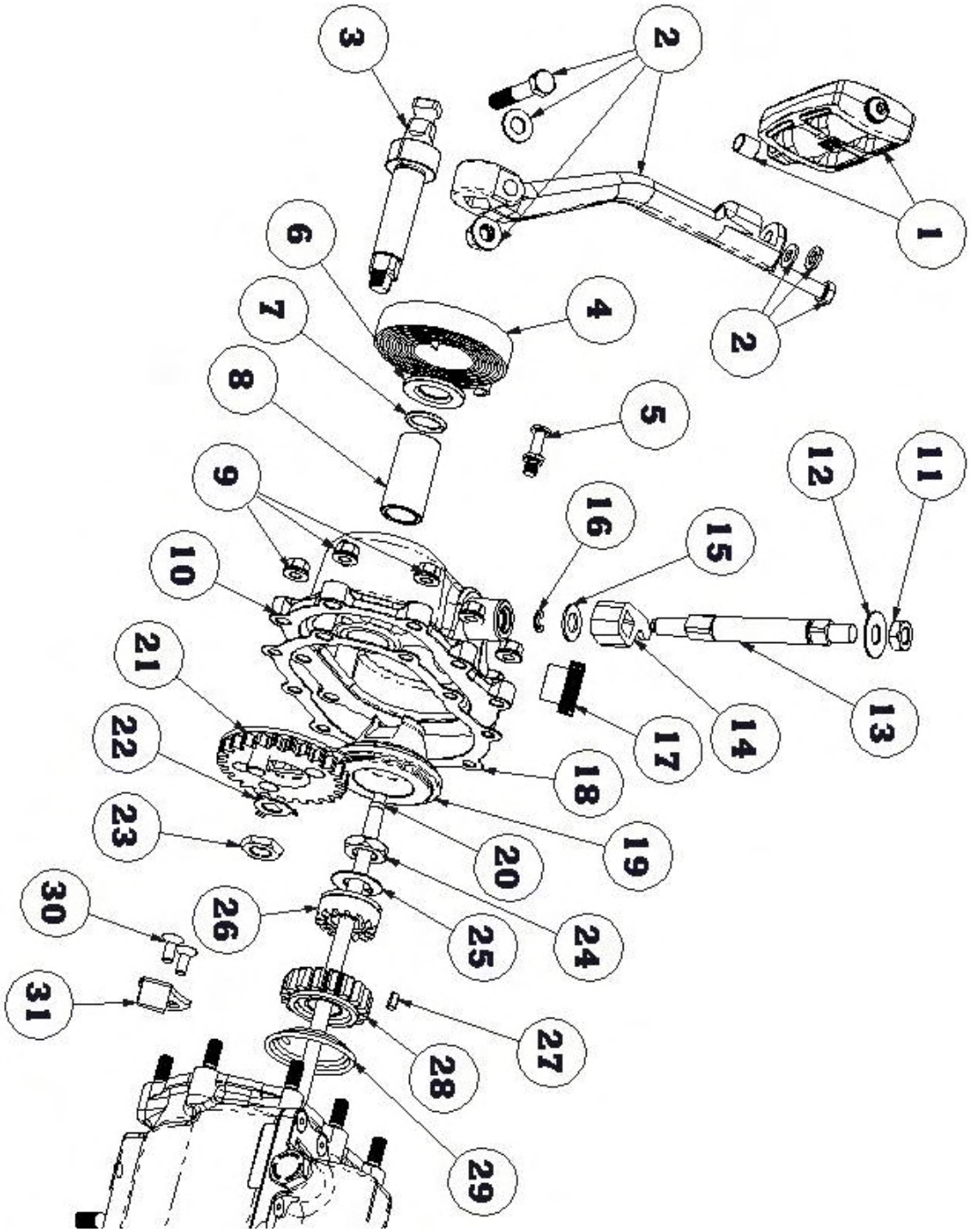


FIGURE 1

BAKER 4 SPEED PARTS DETAIL FIGURE 1

ITEM	QTY	PN	DESCRIPTION
1	1	353-64	Pedal Assembly
2	1	292020	Kicker Arm Assembly
3	1	292003	Kicker Shaft
4	1	291222	Return Spring
5	1	292013	Stud, Return Spring
6	1	292016	Washer, Kicker Shaft
7	1	9452K29	O-Ring, Buna # 210
8	1	6391K447	2” Bronze Bushing
9	9	31FNFF0Z	5/16-24; 6 Point Flange Nut
10	1	*******	Kicker Cover, Replica/Chrome
11	1	37127	7/16-20 Nylock Nut
12	1	6497HW	Washer, Release Shaft
13	1	37074-38-MOD	Release Shaft
14	1	37070-39B	Release Fork
15	1	6443HW	Washer, Release Fork
16	1	68077	E-Clip, Release Shaft
17	1	7616-1	Fill Cap, Kicker Cover
18	1	6N4-SIDE	Gasket, Kicker Cover
19	1	56003	Throw out Bearing
20	1	56006 / 56005 / 56004	Release Rod, Clutch
21	1	33350-56	Crank Gear, 24T
22	1	292014	Lock Tab, Crank Gear
23	1	292015	Nut, Crank Gear
24	1	290231	Nut, Starter Gear
25	1	290225	Washer, Starter Gear
26	1	33560-56	Starter Clutch Gear
27	1	33393-50	Key, Starter Gear
28	1	33430-56	Starter Gear, 16T
29	1	13-0128	Spring, Starter Gear
30	2	25C62KFC	1/4-20x.625 FHCS
31	1	33353-36	Bumper Plate

******* = CUSTOMER PREFERENCE OF COVER STYLE AND FIINISH**

BAKER 4 SPEED EXPLODED VIEWS

Ratchet Style Top Cover

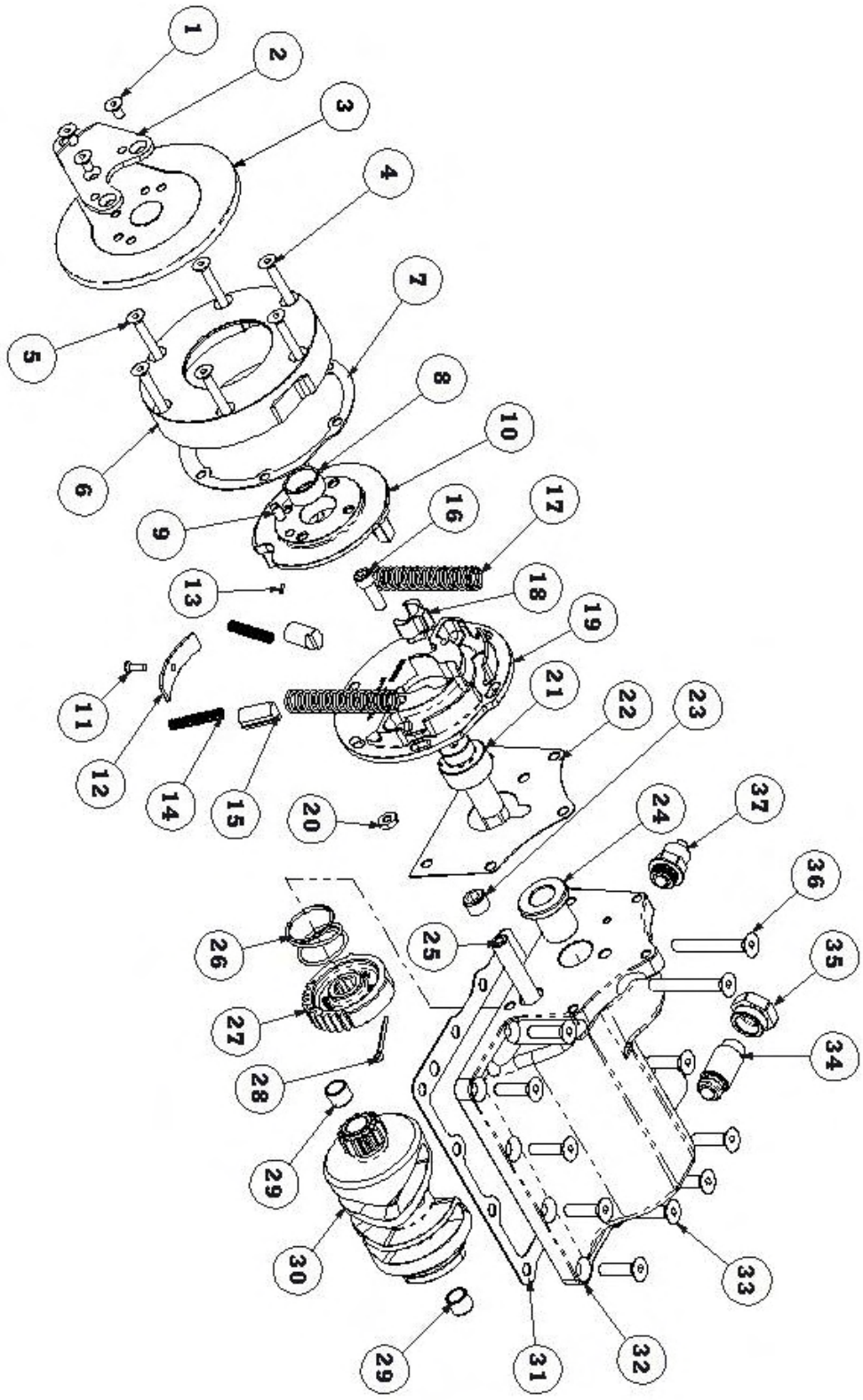


FIGURE 2

BAKER 4 SPEED PARTS DETAIL FIGURE 2

ITEM	QTY	PN	DESCRIPTION
1	3 / 4	10C50KFC0Z	10-24 X .500” FHCS, Lever
2	1	1-26 / 1-27	Shift Lever
3	1	********	Dust Cover
4	5	10C150KFCS	10-24 X 1.5” FHCS, Cover
5	1	10C125KFCS	10-24 X 1.250” FHCS, Cover
6	1	133-4R / 133-4B / 133-4P	Cover, Ratchet
7	1	158-4GAS	Gasket, Ratchet Cover
8	1	34498-52	Bushing, Ratchet Carrier
9	2	18R37PDO	3/16” X .375” Solid Dowel
10	1	132-4-BO	Ratchet Carrier
11	1	6C43MXF0Z	6-32 X .4375” FHMS
12	1	34525-54	Pawl Retainer
13	2	6R25PRP0P	Roll Pin, 1/16” X .250”
14	2	34482-53	Spring, Shifter Pawl
15	2	34478-75	Pawl, Center Groove
16	1	25C50KCS	1/4-20 X .500” SHCS
17	2	LC055G12M	Spring, Carrier Return
18	1	135-4-BO	Stop, Carrier Spring
19	1	131-4-HA	Backing Plate, Ratchet
20	1	10CNMSS	10-24 Nut, Ratchet Cover
21	1	134-4 / 160N1-4	Ratchet Shaft
22	1	155-4GAS	Gasket, Backing Plate
23	1	50F37KKCS	1/2-20 X .375” Set Screw
24	1	34435-52	Bushing, Ratchet Shaft
25	1	128-4	Drum Rod (4.750” Long)
26	1	33390-26	Spring, Ratchet Gear
27	1	136FL-4 / 137FX-4 / 138N1-4	Ratchet Gear
28	1	9R100PCO0P	Cotter Pin, 3/32” X 1”
29	2	PAPZ0606P10	Permaglide® Bushing
30	1	122FL-4 / 123N1-4 / 124FX-4	Shift Drum
31	1	156-4GAS	Gasket, Top Cover
32	1	121-4R / 121-4B / 121-4P	Top Cover
33	10	25C100KFCS	1/4-20 X 1” FHCS SS
34	1	F-232097	Linear Detent
35	1	126-4	Cap, Linear Detent
36	2	25C200KFCS	1/4-20 X 2” FHCS SS
37	1	33900-59	Neutral Switch

*********= COMES WITH # 2**

BAKER 4 SPEED EXPLODED VIEWS

Jockey Style Top Cover

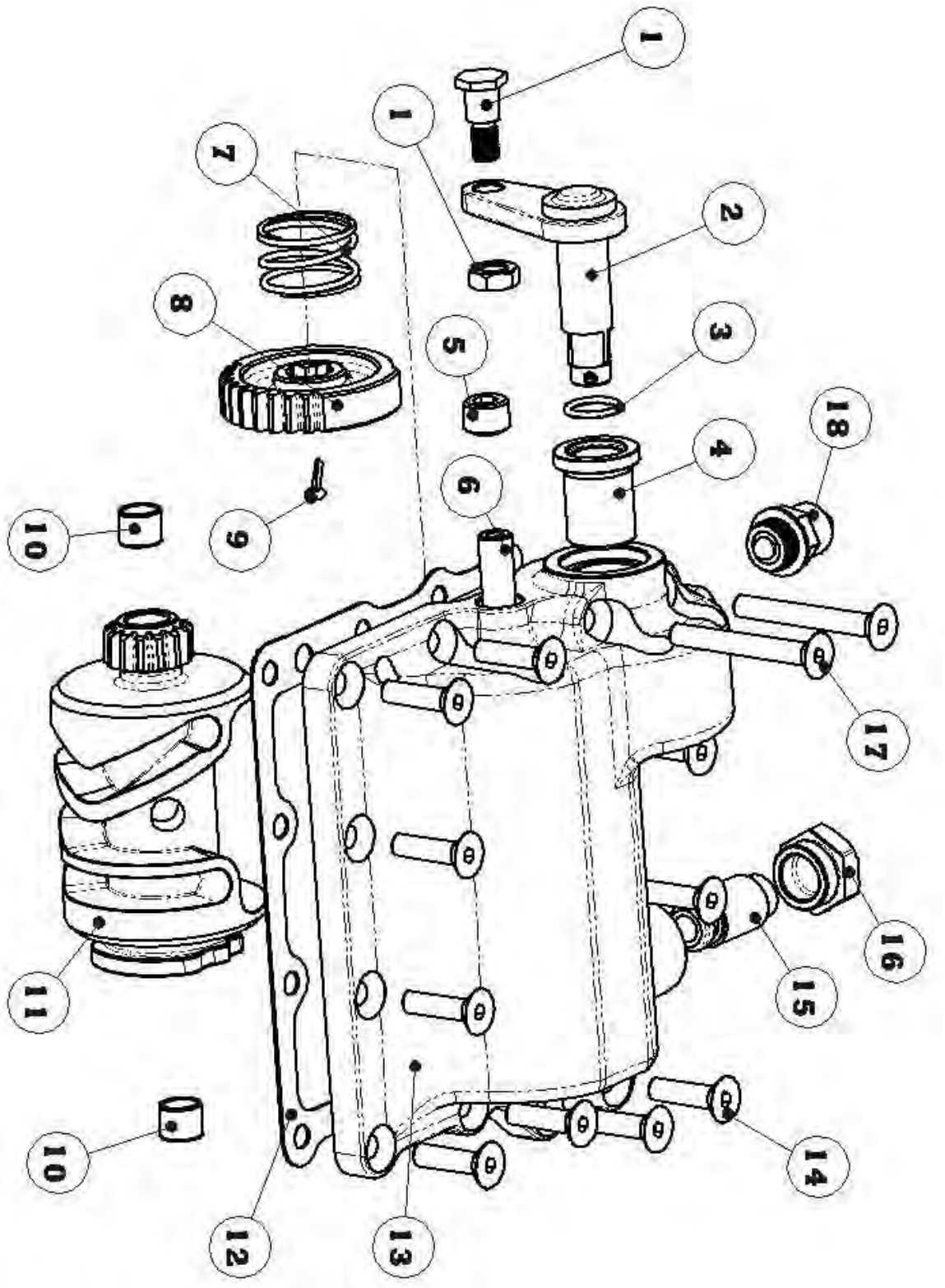


FIGURE 3

BAKER 4 SPEED PARTS DETAIL FIGURE 3

ITEM	QTY	PN	DESCRIPTION
1	1	1-127	Shoulder Bolt w/Nut
2	1	17-0500	Threaded Shift Lever
3	1	66808	O-Ring, Buna #014
4	1	34430-36-A	Bushing, Jockey Top
5	1	50F37KKCS	1/2-20 X .375” Set Screw
6	1	128-4	Rod, Shift Drum
7	1	33390-26	Spring, Shifter Gear
8	1	136FL-4 / 138N1-4	Gear, Shift Drum
9	1	9R100PCO0P	Cotter Pin
10	2	PAPZ0606P10	Bushing, Drum Rod
11	1	122FL-4 / 123N1-4	Shift Drum
12	1	156-4GAS	Gasket, Top Cover
13	1	159-4R / 159-4B / 159-4P	Jockey Top Cover
14	10	25C100KFCS	1/4-24 X 1.000” FHCS
15	1	F-232097	Linear Detent
16	1	126-4	Cap, Linear Detent
17	2	25C200KFCS	1/4-24 X 2.000” FHCS
18	1	33900-59	Neutral Switch

BAKER 4 SPEED EXPLODED VIEWS

Shift Fork Components; 1965-E84 Case Shown

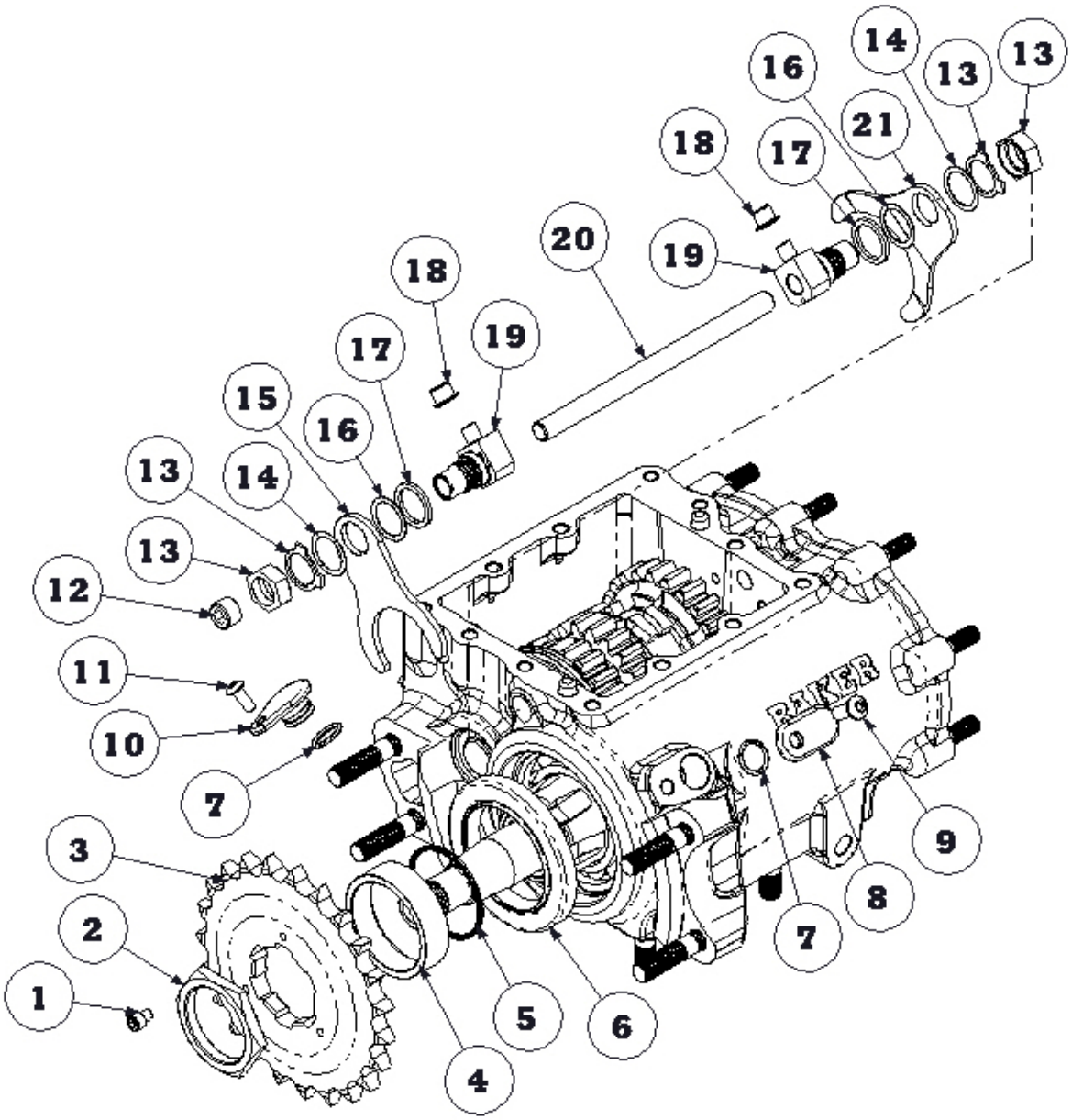


FIGURE 4

BAKER 4 SPEED PARTS DETAIL FIGURE 4

ITEM	QTY	PN	DESCRIPTION
1	1	10C25KLH	10-24 X .250” Low Head
2	1	35211-91-6N4	Sprocket Nut
3	1	23T-64 / 24T-64	Sprocket
4	1	33334-4	Spacer, Sprocket
5	1	11165A	Quad Seal
6	1	12044-4B	Seal, Transmission Case
7+	2	66808	O-Ring, Buna #14
8+	1	108-6EP	Speedo Plug
9+	1	73753	¼-20 x .625” BHCS
10	1	157-4P	Speedo Plug, Gear Drive
11	1	10C50KBCS	10-24 x .500” BHCS
12	1	50F37KKCS	½-20 x .375” Set Screw
13	1	34179-KIT	Nut w/ Washer Kit
14	***	6750	Shim, Shift Fork
15	1	209760	3rd & 4th Shift Fork
16	***	6752	Shim Shift Fork
17	2	6754	Washer, Shift Fork
18	2	34168-39	Hat, Shift Fork
19	2	34182-76	Finger, Shift Fork
20	1	143-4-ROD	Fork Rod; 5.850” Long
21	1	209750	1st & 2nd Shift Fork

*****= QUANTITY WILL VARY**

+= WILL ONLY COME ON 1965-E84 TRANSMISSION CASES

BAKER 4 SPEED EXPLODED VIEWS

Transmission Case and Gearset

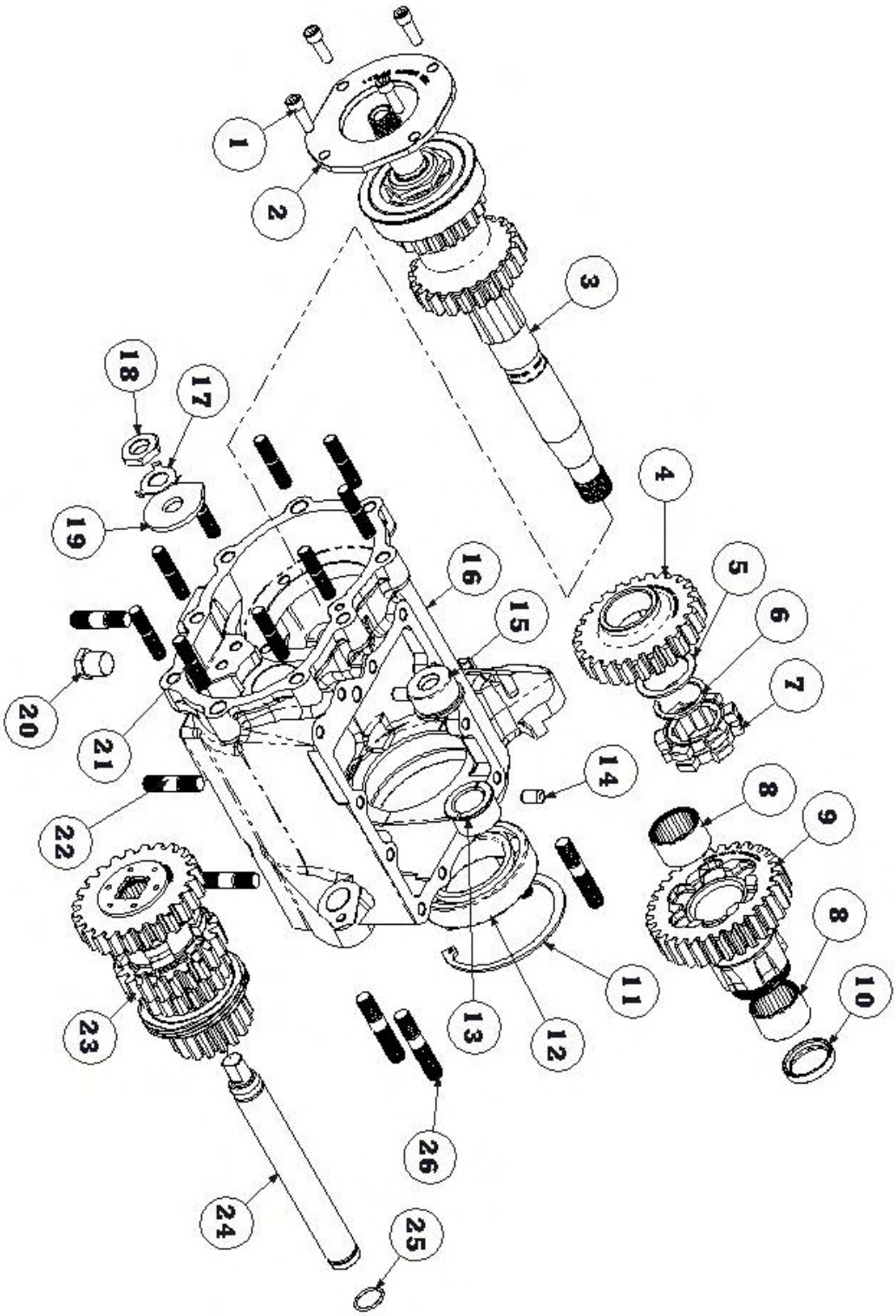


FIGURE 5

BAKER 4 SPEED PARTS DETAIL FIGURE 5

ITEM	QTY	PN	DESCRIPTION
1	4	25C75KCS	1/4-20 X .750" SHCS
2	1	125-4-BO	Retainer Plate
3	1	See Page 12	Mainshaft Assembly
4	1	144-4-1.25 3M	3rd Gear Mainshaft
5	1	35365-36	Thrust Washer, 3rd Gear
6	1	11067A	Retaining Ring
7	1	148-4 3/4	Dog Clutch, 3rd & 4th Gear
8	2	SCE-1612	Caged Needle Bearing
9	1	146-4 4M	Main Drive Gear
10	1	12044-4B	Seal, Main Drive Gear
11	1	300RRIB	Beveled Snap Ring, 3"
12	1	6009CE	Bearing, Main Drive Gear
13	1	36045-76	Case Bushing, Left Side
14	2	31R50PDO	5/16" x 1/2" Solid Dowel
15	1	36048-76A	Case Bushing, Right Side
16	***	120-4R / 120-4B / 120-4P	Transmission Case 1965-85
16	***	130-4R / 130-4B / 130-4P	Transmission Case 1936-64
17	1	292014	Lock Tab Countershaft
18	1	292015	Nut, Countershaft
19	1	35630-36	End Plate, Countershaft
20	1	22H-S05M-CLR	Zero Leak Drain Plug
21	9	AV9676Z	Stud, Side Cover
22	5	AV9683Z	Stud, Bottom Of Case
23	1	See Page 12	Countershaft Assembly
24	1	207770	Countershaft
25	1	66810	O-Ring, Buna #16
26	4+/-	AV9686Z	Stud, Transmission Case

***** = CUSTOMER PREFERENCE; DEPENDS ON YEAR AND FINISH**

4+/- = WILL COME WITH CASE PN 120-4R / 120-4B / 120-4P ONLY

BAKER 4 SPEED EXPLODED VIEWS

Transmission Gearset

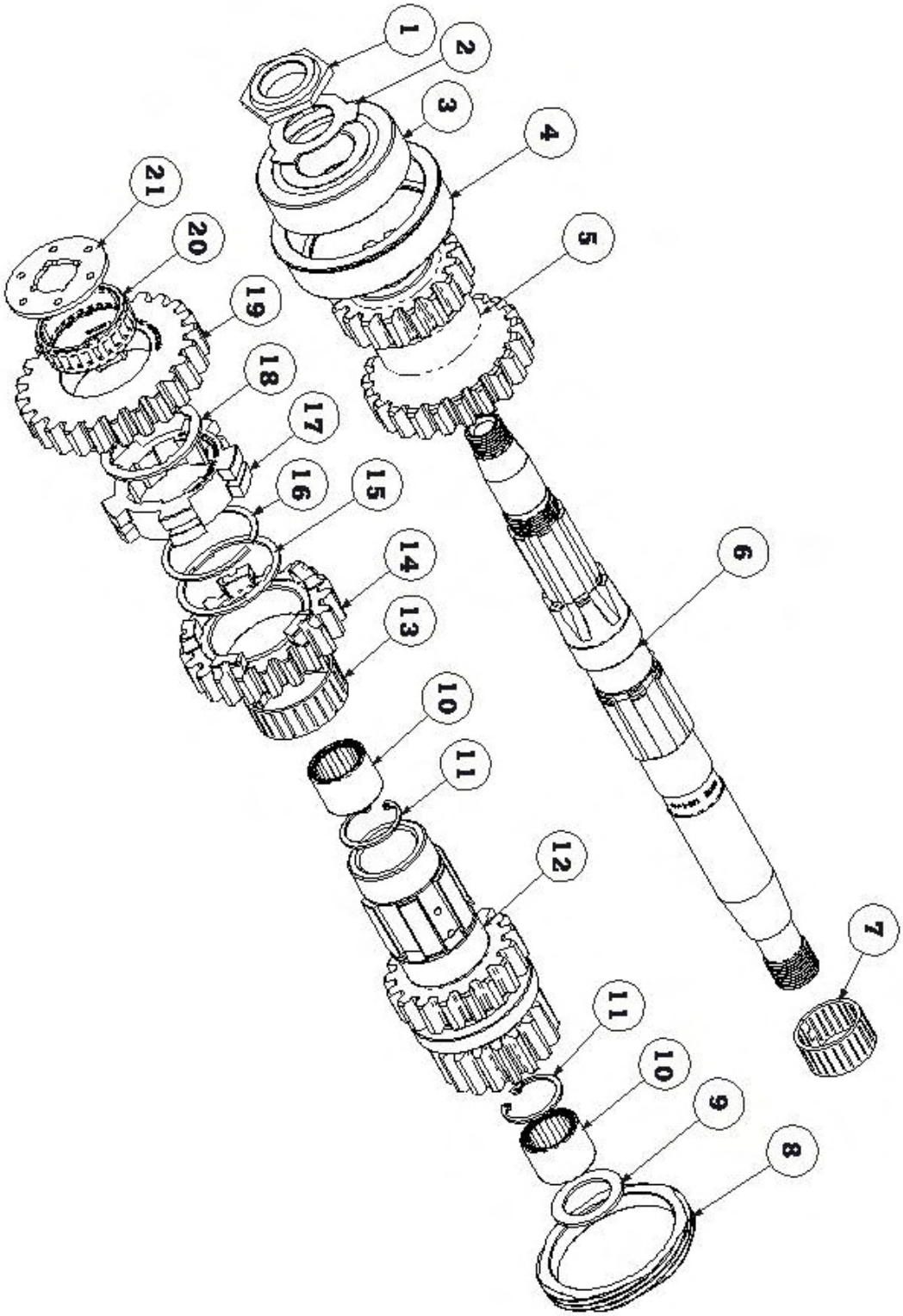


FIGURE 6

BAKER 4 SPEED PARTS DETAIL FIGURE 6

ITEM	QTY	PN	DESCRIPTION
1	1	168-6N4	Nut, Mainshaft
2	1	35050-40	Lock Tab, Mainshaft
3	1	6305Z	Bearing, Mainshaft
4	1	35100-79	Housing, Bearing
5	1	145-4-2.50 1M2M	1st & 2nd Gear Cluster
6	1	********	Mainshaft
7	1	FBNPF-263015Z	Split Needle Bearing 3rd Gear
8	1	17-0094 / 17-9160 / 17-9161	Speedo Ring Gear
9	1	35915-36	Thrust Washer Countershaft
10	2	SCE-1212	Caged Needle Bearing
11	2	100RRRI	Retaining Ring; 1”
12	1	140-4-1.25 3C4C	3rd & 4th Gear Countershaft
13	1	BNH-600-361	Split Needle, 2nd Gear
14	1	141-4-1.70 2C	2nd Gear Countershaft
15	1	129-4	Thrust Washer, 2nd Gear
16	1	35810-36	Retaining Ring, 2nd Gear
17	1	147-4 1/2	Dog Clutch, 1st & 2nd
18	1	139-4	Thrust Washer, 1st Gear
19	1	142-4-2.50 1C	1st Gear Countershaft
20	1	K35X40X13H	Needle Bearing, 1st Gear
21	1	---------	Thrust Washer, 1st Gear

******= MAINSHAFT PART NUMBERS:** 149-4M/S (1970-E84 Splined M/S), 150-4M/S (1970-E84 Tapered M/S), 151-4M/S (1965-69 Tapered M/S), and 152-4M/S (1936-64 Tapered M/S)

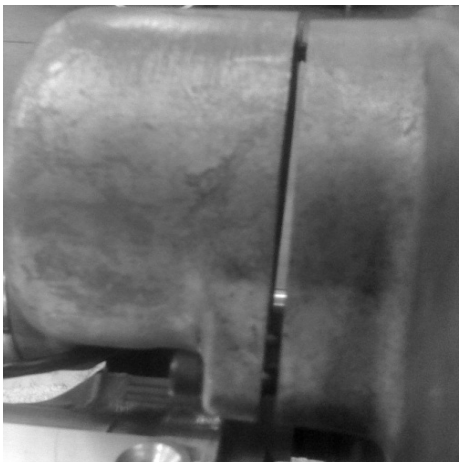
———= THRUST WASHER PART NUMBERS: 35883-36 (.095” Thick), 38582-36 (.090” Thick), and 38579-36 (.085” Thick)

BAKER 4 SPEED SPEED SENSOR INSTRUCTIONS

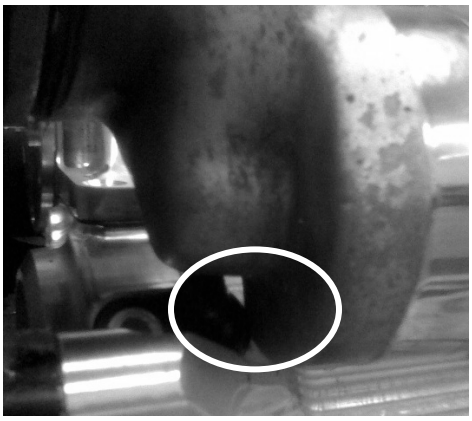
INSTRUCTIONS

Install the transmission per you Factory Service Manual; before you install the starter (electric start applications only; 1965-UP).

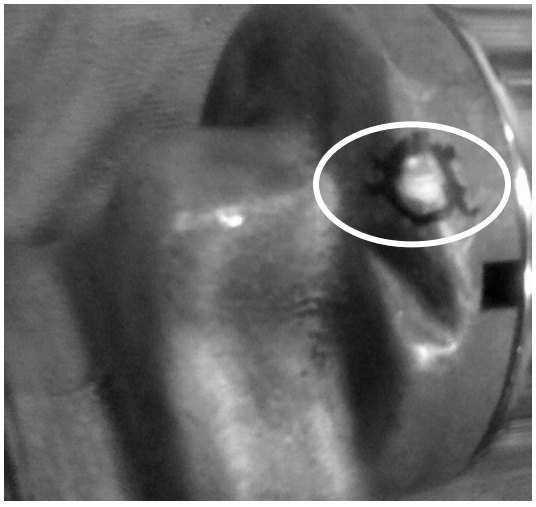
1. With the Transmission in the bike frame and Inner Primary mounted; Install the electronic speed sensor.
    a. Remove the speed sensor plug on the transmission ear (rear left side of transmission).
    b. Lubricate the speed sensor O-Ring with transmission oil; install using Blue Loctite ® and torque the bolt to 110-120 in-lbs.
2. Fit up the starter to the primary with a couple bolts to hold it into position; do not tighten, you will notice if using a stock style starter that the housing of the starter will hit the top of the speed sensor. You will have to clearance the starter housing for proper fitment (figures 7 & 8).
3. Using a Sharpie® mark the area where the starter contacts the speed sensor.
4. Using a rat tail file or die grinder remove the material on the starter housing until the starter clears the speed sensor. You might have to do a couple checks and remark the starter to make sure that you are taking enough material for proper fitment (figure 8). You should have at least a 1/16" of clearance when done (figure 10).
5. After starter fits properly continue with your transmission installation per your Factory Service Manual.



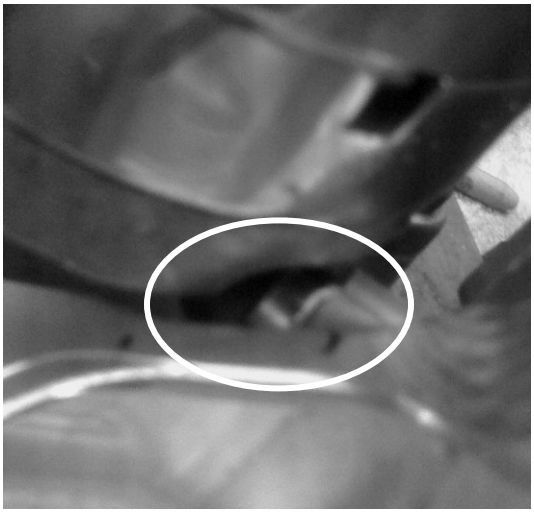
SHOWING FITMENT BEFORE MODIFICATION | FIGURE 7



AREA OF CONCERN, BEFORE MODIFICATION | FIGURE 8



STARTING TO TAKE MATERIAL OFF OF MARKED AREA | FIGURE 9

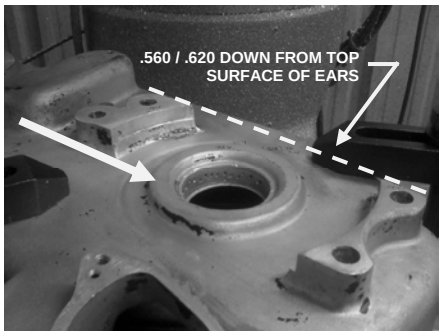


STARTER INSTALLED AFTER MODIFICATION | FIGURE 10

BAKER 4 SPEED – 1965-69 STOCK MODELS

INSTALLATION SUPPORT FOR 1965-69 BAKER 4 SPEEDS

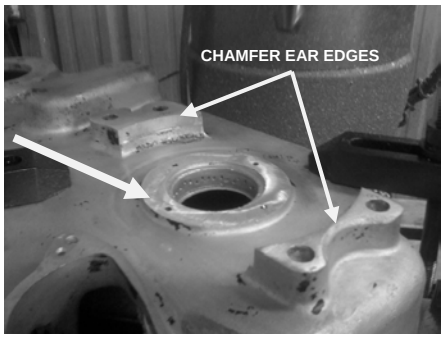
BAKER 4 Speeds utilize an early 5 speed spline design for the main drive gear. Using this design requires a slightly offset sprocket to wrap around the modern spacer and drive gear. On 1965-69 models the stock inner primary has a lip which will hit the sprocket before going onto the transmission all of the way. Following these instructions and images, modify your stock H-D primary for proper fitment. These instructions do not apply for aftermarket inner primaries or belt drive motor plates.



STOCK 65 INNER | FIGURE 11

Modification of stock 65-69 inner primary

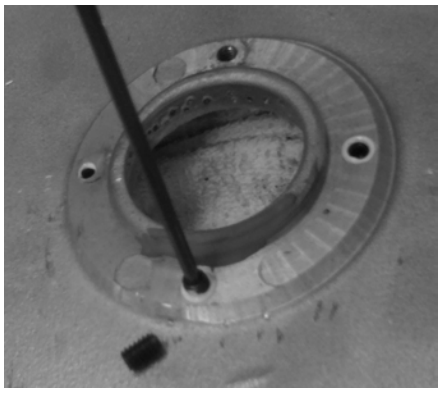
- Looking at figure 11 you can see the inner lip that has to be machined down in order to clear the sprocket and sprocket nut.
- Machine down this lip; measuring from the ears on the primary down; finish machine should be: .560” / .620” from the ear surface, figure 11. Notice that the threaded holes are now exposed on the casting from machining, figure 12.
- Chamfer the inner primary ears on the inside edge, breaking the edge .020/.030 X 45, figure 12.



MODIFIED 65 INNER | FIGURE 12

Make sure to test fit the primary onto the transmission before running. Extra machining clearance might be needed for proper fitment.

- After making sure everything fits properly, using four 1/4-20 X .375” set screws plug off the threaded holes. Apply some pipe thread sealant on the set screws then install from the inside, figure 13
- Install the primary per your Factory Service Manual.



INSTALLING SET SCREWS | FIGURE 13

BAKER 4 SPEED TRANSMISSION

SPECIALORDERS

A minimum $500 deposit is required with all special orders. Special orders include unique case finishes, unique side door requests (i.e.; wrinkle black door or no logo).

ALL OTHER ORDERS

Orders can be pre-paid using VISA, MasterCard or American Express.

Prices shown are F.O.B. Haslett, MI. BAKER™ provides free UPS ground shipping on all retail orders for complete transmissions or transmission kit. UPS air shipment is available upon request. Customer is responsible for air shipment premiums.

LIMITED WARRANTY

BAKER™ Inc. transmission assemblies, transmission kits, and wide tire kits are guaranteed to the original purchaser to be free of manufacturing defects in materials and workmanship for a period of 5 years from the date of purchase or up to 50,000 miles - whichever is sooner.

If the product is found by BAKER™ to be defective, such products will, at the option of BAKER™, be replaced or repaired at cost to BAKER™.

In the event warranty service is required, the original purchaser must call or write BAKER™ immediately with the problem.
If it is deemed necessary for BAKER™ to make an evaluation to determine whether the transmission assembly or transmission kit is defective, the entire transmission assembly, whether originally purchased as an assembly or kit, must be properly packaged and returned prepaid to BAKER™ with a copy of the original invoice of purchase.
If after an evaluation has been made by BAKER™ and a defect in materials and/or workmanship is found, BAKER™ will, at BAKER™ option, repair or replace the defective part of the assembly.
Warranty card must be returned within 45 days of purchase to be valid.

ADDITIONALWARRANTY PROVISIONS

This limited warranty does not cover labor or other costs or expenses incidental to the repair and or replacement of BAKER™ products. This warranty does not apply if one or more of the following situations is judged by BAKER™ to be relevant: improper installation, accident, modification (including but not limited to use of unauthorized parts), racing, high performance application, mishandling, misapplication, neglect (including but not limited to improper maintenance), or improper repair.

BAKER™ shall not be liable for any consequential or incidental damages arising out of or in connection with a BAKER™ transmission assembly, transmission kit, swingarm, fender, component or part. Consequential damages shall include without limitation, loss of use, income or profit, or losses sustained as the result of injury (including death) to any person or loss of or damage to property.

BAKER™ transmissions, transmission kits, and Wide Tire Kits are designed exclusively for use in Harley-Davidson® motorcycles. BAKER™ shall have no warranty or liability obligation if a BAKER™ part is used in any other application.

If it is determined that a BAKER™ transmission assembly has been disassembled during the warranty period for any reason, this limited warranty will no longer apply.

BAKER 4 SPEED TRANSMISSION

The words Harley, and H-D are registered trademarks and are for reference only. Use of H-D model designations and part numbers are for reference only. BAKER Drivetrain has no association with, and makes no claim against, these words, trademarks, or companies.

It is the sole responsibility of the user to determine the suitability of this product for his or her use, and the user shall assume all legal, personal injury risk and liability and all other as well as all other obligations, duties and risks associated therewith.

CUSTOMER SUPPORT

For any installation or service questions, please contact our BAKER technical department toll free: 1-877-640-2004.